

FORM PTO-1390 (Modified)
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

990.1228

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/581279

INTERNATIONAL APPLICATION NO.

PCT/FI98/00943

INTERNATIONAL FILING DATE

03 December 1998 (03.12.98)

PRIORITY DATE CLAIMED

10 December 1997 (10.12.97)

TITLE OF INVENTION

ROLL FOR A PAPER OR BOARD MACHINE

APPLICANT(S) FOR DO/EO/US

Osmo NIKULAINEN; Heikki KARTTUNEN; Antti LEINONEN; Seppo KIVIRANTA; Hannu VILLGREN; Miikka KETTUNEN; and Samppa J. SALMINEN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

- Letter re Priority

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21. The following fees are submitted:.

CALCULATIONS PTO USE ONLY

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

- ☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$970.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00
- ☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$690.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$970.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☒ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

\$130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	14 - 20 =	0	x \$18.00
Independent claims	2 - 3 =	0	x \$78.00

\$0.00

\$0.00

Multiple Dependent Claims (check if applicable).

☐

\$0.00

TOTAL OF ABOVE CALCULATIONS =

\$1,100.00

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable).

☐

\$0.00

SUBTOTAL =

\$1,100.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).

+

\$0.00

TOTAL NATIONAL FEE =

\$1,100.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).

☒

\$40.00

TOTAL FEES ENCLOSED =

\$1,140.00

Amount to be:

refunded

\$

charged

\$

☒ A check in the amount of **\$1,140.00** to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **50-0518** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

STEINBERG & RASKIN, P.C.
1140 Avenue of the Americas
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SIGNATURE

Martin G. Raskin

NAME

25,642

REGISTRATION NUMBER

June 9, 2000

DATE

UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Application of: Osmo NIKULAINEN et al.
Serial No.: Not yet known
Filed: Simultaneously
For: **ROLL FOR A PAPER OR BOARD
MACHINE**

PRELIMINARY AMENDMENT

Commissioner of Patents
Washington, D.C. 20231

June 9, 2000

Sir:

Prior to examination and calculation of the filing fee, please amend the above-identified application as follows.

IN THE SPECIFICATION:

Please amend the specification as follows (reference is made to the lines as numbered).

Page 1, line 5, insert --**FIELD OF THE INVENTION**--;

lines 6-7, delete entire text and insert therefor the following:

--The present invention relates to a roll for a paper or board machine, and in particular to a roll of the type having a number or openings extending through the mantle.--

line 8, insert --**BACKGROUND OF THE INVENTION**--.

Page 3, lines 10-11 , delete entire text;

lines 13-14, delete entire text;

line 15, insert --**OBJECTS AND SUMMARY OF THE INVENTION**--.

Page 4, line 5, insert --**BRIEF DESCRIPTION OF THE DRAWINGS**--;

line 22, insert --**DETAILED DESCRIPTION OF THE INVENTION**--.

IN THE CLAIMS:

Please amend the claims as follows.

Claim 1, line 7, change “characterized in that” to --wherein--.

Claim 2, line 1, change “characterized in that” to --wherein--.

Claim 3, line 1, change “characterized in that” to --wherein--.

Claim 4, line 1, change “characterized in that” to --wherein--.

Claim 5, line 1, change “characterized in that” to --wherein--.

Claim 6, line 1, change “characterized in that” to --wherein--.

Please add the following new claims:

--7. A roll for a paper or board machine comprising:

a roll mantle having an outer surface;

a plurality of bores extending through said roll mantle, each of said bores being spaced from an adjacent one of said bores to define a space there between;

means for interconnecting selected ones of said plurality of bores for permitting a flow to travel between said selected bores.

8. The roll according to claim 7, wherein said means for interconnecting selected ones of said plurality of bores comprises a plurality linear recesses formed in the outer surface of said roll, each one of said plurality of linear recess extending between adjacent ones of said plurality of bores in said space defined between adjacent bores

9. The roll according to claim 8, wherein said plurality of linear recesses comprises at a first groove for interconnecting a first group of selected bores of said plurality of bores a second groove for interconnecting a second group of selected bores of said plurality of bores.

10. The roll according to claim 8, wherein said first groove is structured and arranged to extend in a first direction and said second groove is structured and arranged to extend in a second direction which is orthogonal with respect to said first direction.

11. The roll according to claim 9, further comprising a plurality of support points for support a wire, said support points arranged between adjacent ones of said plurality of bores.

12. The roll according to claim 8, wherein said plurality of linear recess comprise a first and second groove extending in a first direction and a third and forth grove extending in a second direction which is orthogonal with respect to said first direction.

13. The roll according to claim 9, wherein said grooves and said plurality of bores cooperate to define support points arranged in spaces defined between said grooves and said plurality of bores.

14. The roll according to claim 7, wherein said means for interconnecting selected ones of said plurality of bores comprises a plurality of circular grooves arranged in said outer surface, each one of said circular grooves being arranged to encircle a respective one of said plurality of bores and wherein a circular groove encircling one bore is arranged to extend over each adjacent bore.--


REMARKS

The specification has been amended to include section headings at appropriate locations.

Claims 1-6 as filed in the International Patent Application have been amended have been amended to correct minor informalities therein. New claims 7-14 have been added to the application which are directed to embodiments disclosed in the specification.

Respectfully submitted,

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Roll for a paper or board machine

5

The invention relates to a roll for a paper or board machine defined in the preamble of claim 1.

10 In paper or board machines, a web forming section employs mainly suction rolls which usually comprise a perforated roll mantle attached to end flanges at the ends of the roll. The end flanges are in turn journalled rotatably on attachment flanges situated at the ends of the roll and attached to the frame of the machine. Inside the roll mantle, there may be a static suction box attached to the attachment flanges enabling suction to be applied to a given sector of the suction roll. The interior of
15 the roll may also be empty, in which case suction is applied to the entire circumference of the roll mantle. The ends of the roll are provided with ducts by which an external source of negative pressure can be connected to the roll. Moreover, bores extending through the roll mantle are normally provided, in the outer surface of the mantle, with countersinks by means of which the unbroken connecting portions
20 surrounding the holes of the bores in the outer surface of the roll mantle are made smaller and the open area of the outer surface of the roll mantle is increased.

The press section of paper or board machines in turn employs rolls which have a roll mantle that is perforated or provided with blind-drilled bores. In that case, the
25 interior of the roll is not necessarily connected to a separate source of negative pressure. In a press nip, water is sucked into the holes, blind-drilled bores or other recesses of the roll mantle and removed from them after the press nip by means of the centrifugal force. In order to reduce the contact pressure, the mantle of press section rolls is normally coated with a material that is softer than steel, for example,
30 with some rubber-like material. The blind-drilled bores in a roll provided with a coated mantle may extend some distance into the steel mantle or merely into the coating depending on a desired volume of the bores. Moreover, both through bores

and blind-drilled bores are normally provided with countersinks in the outer surface of the mantle for reducing the size of the unbroken connecting portions that surround the holes or recesses in the outer surface of the roll mantle and for enlarging the open area of the outer surface of the roll mantle.

5

Around the perforations of the roll mantle on the outer surface of the roll mantle, despite holes, blind-drilled bores or recesses, there remain relatively large unbroken connecting portions at which the suction effect is weaker. For this reason, said unbroken outer surface of the roll mantle causes marking in the paper web.

10

One solution to this marking problem has been to provide the roll mantle, for example, with a coarse wire net, by which the open surface of the outer face of the roll mantle has been increased. The wire net or a wire sock is mostly made of plastic and it is attached in place by shrinking to form the outermost layer of the roll. The manufacture of such a wire sock and its fitting to the outer face of the roll mantle constitute an additional work stage in the manufacture of the roll. In addition, the wire sock wears in use and thus it has to be replaced at certain intervals.

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It is also known to mount on the roll mantle a separate honeycomb arrangement made of metal by means of which the open surface of the outer face of the roll mantle is enlarged. It is difficult to fasten this kind of metal honeycomb to the face of the roll mantle and it may become detached in use.

25

30

DE patent 21 40 776 discloses a suction roll of a paper machine comprising a mantle stiffened against bending and a perforation extending through the mantle of the roll and forming a certain pattern. Additionally, the mantle surface of the roll is provided with grooves that connect a row of holes so that a symmetrical embossed pattern of the surface is formed in practice. The hole area in the surface of the roll mantle is over 50 % and it may be nearly 90 % of the total area of the roll mantle. It is also stated in the publication that some of the above-mentioned holes may be blind-drilled bores or that, in addition to the above-mentioned holes, blind-drilled bores are made into the surface of the mantle for improving the water retention capacity of the roll.

In this arrangement, the connecting surface of the walls between two adjacent grooves in the surface of the mantle forms a solid connecting portion supporting the wire or equivalent.

- 5 The problem in this arrangement of *DE patent 21 40 776* is the solid connecting portions at which the suction effect of the roll is weaker. These solid connecting portions constitute an obstruction to the free flow of water into the holes or blind-drilled bores.
- 10 The arrangement in accordance with the invention provides an essential improvement over the prior art arrangements.

The main characteristic features of the roll in accordance with the invention are set forth in the characterizing clause of claim 1.

15

- The roll in accordance with the invention provides a very good and even flow of water into the holes extending through the mantle of the roll and/or into the blind-drilled bores and/or equivalent openings situated in the outer surface of the roll mantle. Moreover, in the roll in accordance with the invention, no separate wire
- 20 sock is needed on the outer surface of the roll mantle. The open area of the outer surface of the mantle of the roll in accordance with the invention is about 70-90 % depending on the application.

- The arrangement of the invention may be used in a roll of a paper or board machine
- 25 which comprises either openings extending through the roll mantle, e.g. through bores, or recesses formed into the outer surface of the mantle, e.g. blind-drilled bores, or a combination of them. Such rolls are used, for example, in a web former and in a press section. The invention may be used in a suction roll where suction is applied to the circumference of the entire mantle or in a suction roll having a static
- 30 suction box by means of which suction is applied to a given sector of the roll. The arrangement in accordance with the invention may also be used in a roll which employs no external source of negative pressure, by which a negative pressure is

maintained in the interior of the roll. In that case, the water that is being removed from the web is transferred into the holes and/or blind-drilled bores of the roll mantle at the point of compression by the action of a pressure difference produced in the wire or equivalent supporting the web.

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In the following, the invention will be described in more detail with reference to the figures in the accompanying drawings, to the details of which the invention is, however, not intended to be exclusively confined.

10 Figure 1 is a schematic sectional view of a suction roll.

Figure 2 shows one embodiment of a surface pattern in a mantle of a roll in accordance with the invention.

15 Figure 3 shows a variant of the embodiment of Fig. 2.

Figure 4 shows a second embodiment of a surface pattern in a mantle of a roll in accordance with the invention.

20 Figure 5 shows a third embodiment of a surface pattern in a mantle of a roll in accordance with the invention.

Fig. 1 is a view of principle of a suction roll where the arrangement in accordance with the invention may be used. The suction roll comprises a roll mantle 11, which is rotatably journaled on axle journals 13A and 13B connected to the roll mantle 11 through end flanges 12A and 12B. The roll mantle 11 has perforations 15 which are formed of numerous holes 15 extending through the roll mantle 11. The figure shows only some of the perforations 15 of the mantle 11. The interior of the roll is here empty, but inside the roll there may also be a suction box by means of which suction is guided to a given sector of the roll mantle. At least one 13B of the axle journals comprises ducts which lead to the interior of the roll and to which an external source of negative pressure (not shown in the figure) can be connected. Air

is sucked out (arrow P_2) by means of the source of negative pressure from the entire interior of the roll or at the sector formed by the suction box, in which connection a corresponding amount of air (arrow P_1) flows into the roll through the perforations 15 of the roll mantle. The perforations 15 of the roll mantle 11 may be composed of
5 bores extending with the same diameter through the entire mantle 11 or countersinks may have been made into the bores in the outer surface of the mantle 11, whereby the area of the holes 15 opening into the outer surface of the mantle 11 has been enlarged. The perforations 15 of the roll mantle 11 are advantageously formed to be spiral-shaped so that the holes are not situated in rows in the axial direction of the
10 roll. By this arrangement, the emptying of the holes 15 of water and the subsequent filling of the holes with air can be arranged to take place stepwise in terms of time, whereby the noise caused by this can be reduced. The diameter of the holes 15 is generally about 2—5 mm and the diameter of the countersinks is generally about 2—15 mm.

15
Fig. 2A shows one embodiment of a pattern in an outer surface of a mantle of a roll in accordance with the invention. The holes and/or blind-drilled bores or their countersinks 15 situated in the roll mantle form a regular pattern in the outer surface of the roll mantle. Through a line formed by the centres of the holes and/or blind-
20 drilled bores 15, it is possible to draw a curve which extends spirally along the outer surface of the roll mantle and whose angle of spiral relative to the axis X—X of the roll is α . In this figure, said angle α is about 45° , but in practical applications the angle of spiral α is, however, considerably smaller than 45° in order that the holes and/or blind-drilled bores 15 shall not be placed in rows parallel to the axis X—X of
25 the roll. In the example of Fig. 4, which shows another embodiment of the invention, the angle of spiral α is about 10° . The arrangement in accordance with the invention may in itself be used at any angle of spiral α and with any regular pattern formed by holes and/or blind-drilled bores.

30 The row formed by the holes and/or blind-drilled bores 15 in a first direction S1 in Fig. 2A is connected by means of a first groove 16 formed into the outer surface of the roll mantle and the row formed by these holes and/or blind-drilled bores 15 in

a second direction S2 is connected by means of a second groove 17 formed into the outer surface of the roll mantle. This figure depicts only two adjacent grooves 16 running in the first direction S1 and two adjacent grooves 17 running in the second direction S2. The width of the crossing grooves 16,17 in the outer surface of the roll mantle corresponds substantially to the diameter of the holes and/or blind-drilled bores or their countersinks 15 in the outer surface of mantle. When the first grooving 16 is made into the outer surface of the mantle on the holes and/or blind-drilled bores 15, a solid connecting portion 16' is formed between the adjacent grooves 16 in the outer surface of the mantle, which connecting portion prevents a free flow of water into the holes and/or blind-drilled bores 15. This solid connecting portion 16' is broken by means of the second grooving 17 situated crosswise with respect to the first grooving 16 and formed on the holes and/or blind-drilled bores 15. In that case, between four holes and/or blind-drilled bores or their countersinks 15 closest to one another, there remains a square-shaped support point 18 for a wire or an equivalent support member of the web running on the surface of the roll, which support point is situated on a level with the original outer surface of the mantle.

By means of the arrangement shown in Fig. 2A, the open area of the outer surface of the roll mantle can be enlarged at its maximum by about 90 % so that only the small square-shaped support points 18 support the wire running on the surface of the roll. From the edges of the square-shaped support points 18, the surface of the mantle inclines into the mantle and opens into the holes and/or blind-drilled bores 15 of the mantle, in which connection the water removed from the web is able to flow freely and evenly into the holes and/or openings of the mantle.

Fig. 2B shows a cross section of the roll mantle at the support points 18. The cross section shows a profile of the grooves 16,17 which is advantageously in the shape of a cone widening upwards to the outer surface of the mantle. The support points 18 are depicted here such that their outer surface constitutes a plane, which is the most preferable arrangement from the point of view of the manufacturing technique. In the arrangement that is the most preferable from the point of view of operation, the outer surface of the support points is hemispherical so that the edges of the square-

shaped support points will not form a sharp angulation for the wire. The hemispherical surface provides a smooth support surface for the wire moving on the surface of the roll. The depth of the grooves 16,17 is advantageously about 1.5—2 mm and they may be made into the outer surface of the roll mantle, for example, by turning,
5 milling or knurling.

Fig. 3 shows a variant of the embodiment of Fig. 2. In Fig. 3, grooves 40,41 formed in first S1 and second S2 directions are provided between rows of holes and/or blind-drilled bores 15 such that the edges of the grooves 40,41 form a tangent
10 to the holes and/or blind-drilled bores or their countersinks 15 in the outer surface of the mantle. In this arrangement, around each hole and/or blind-drilled bore or their countersink 15, there remain, in the outer surface of the mantle, four support points 42 for a wire or an equivalent member supporting the web. The open area of the outer surface of the mantle provided by this embodiment is not as large as that of the
15 embodiment illustrated in Fig. 2, but in this case, too, water moves relatively efficiently and evenly into the holes and/or blind-drilled bores 15.

Fig. 4 shows a second embodiment of a pattern in an outer surface of a roll mantle in accordance with the invention. The holes and/or blind-drilled bores or their
20 countersinks 15 situated in the roll mantle are shown in the figure as completely filled circles. In addition to the holes and/or blind-drilled bores or their countersinks 15, circular grooves 30 are formed into the outer surface of the roll mantle. The grooves 30 are made such that the centre of each groove 30 coincides with the centre of the holes and/or blind-drilled bores 15 and the centre radius of the grooves 30 is
25 equal to the distance between the centres of the holes and/or blind-drilled bores 15. The centres of the holes and/or blind-drilled bores 15 are situated in this example at the apices of an equilateral triangle. The outer surface of the mantle surrounding the holes and/or blind-drilled bores or their countersinks 15 can be opened by means of said grooves 30. Connecting channels extending to the depth of the grooves 30 are
30 thus formed between the holes and/or blind-drilled bores or their countersinks 15 in the outer surface of the mantle. In this embodiment, the wire or equivalent is supported by triangular support points 31. The open area of the outer surface of the

roll mantle can be regulated in this embodiment by regulating the width of the grooves 30. This embodiment, too, provides an efficient flow of water into the holes and/or blind-drilled bores 15.

- 5 Fig. 5 shows a third embodiment of a pattern in an outer surface of a mantle of a roll in accordance with the invention. In this embodiment, blind-drilled bores 50 are provided between holes and/or blind-drilled bores or their countersinks 15 such that each blind-drilled bore opens a connection to the closest holes and/or blind-drilled bores or their countersinks 15 surrounding it. By this means, the open area of the
- 10 roll mantle can be enlarged. The size of the open area of the outer surface of the mantle depends in this embodiment, among other things, on what kind of pattern the holes and/or blind-drilled bores 15 form in the outer surface of the mantle. If blind-drilled bores 50 are made to the hole pattern shown in Fig. 4, a relatively large open area can be achieved, and if blind-drilled bores 50 are made to the hole pattern
- 15 shown in Fig. 5, a slightly smaller open area is achieved. The support points supporting the wire are here denoted with the reference numeral 51.

The claims are presented in the following and the details of the invention may vary within the inventive idea of said claims and differ from the disclosure given above

20 by way of example only.

Claims

1. A roll for a paper or board machine comprising axle journals (13A,13B) supported by which the roll is arranged to revolve, end flanges (12A,12B) to which the axle journals (13A,13B) are connected, a mantle (11) which is connected to the end flanges (12A,12B) and into which mantle (11) a number of openings extending through the mantle (11) and/or recesses (15) formed into the outer surface of the mantle have been made, which openings and/or recesses form a regular pattern, **characterized** in that solid connecting portions in the outer surface of the mantle (11) around said openings, which are preferably holes, and/or around said recesses, which are preferably blind-drilled bores (15), are opened so that, from each opening and/or recess or from their countersink (15), there is a connection, provided in the form of a groove or an additional recess (16,17,40,41,30,50) extending into the outer surface of the roll mantle (11), with at least each of the openings and/or recesses or their countersinks (15) closest to it.
2. A roll as claimed in claim 1, **characterized** in that a double grooving (16,17) is formed into the outer surface of the roll mantle (11) such that the first grooving (16) connects a row of holes and/or blind-drilled bores or their countersinks (15) in a first direction (S1) and the second grooving (17) connects a row of holes and/or blind-drilled bores or their countersinks (15) in a second direction (S2) which crosses the first direction (S1), whereby separate support points (18) supporting the wire and situated between the holes and/or blind-drilled bores or their countersinks (15) are formed into the outer surface of the roll mantle (11).
3. A roll as claimed in claim 1, **characterized** in that a double grooving (40,41) is formed into the outer surface of the roll mantle (11) such that the first grooving (40) is made in a first direction (S1) between a row formed of holes and/or blind-drilled bores or their countersinks (15) and the second grooving (41) is made in a second direction (S2) between a row formed of holes and/or blind-drilled bores or their countersinks (15), which second direction (S2) crosses the first direction (S1), whereby separate support points (42) supporting the wire and situated at the edges

of the holes and/or blind-drilled bores or their countersinks (15) are formed into the outer surface of the roll mantle (11).

4. A roll as claimed in claim 1, **characterized** in that circular grooves (30) are
5 formed into the outer surface of the roll mantle (11) around the holes and/or blind-drilled bores or their countersinks (15).

5. A roll as claimed in claim 4, **characterized** in that the centres of the circular
10 grooves (30) coincide with the centres of the holes and/or blind-drilled bores (15) and the centre radii of the circumference of the grooves (30) are equal to the distance between the centres of the holes and/or blind-drilled bores (15) so that the grooves (30) form channels that connect the holes and/or the blind-drilled bores (15).

6. A roll as claimed in claim 1, **characterized** in that additional blind-drilled bores
15 (50) are made into the outer surface of the roll mantle (11) between the holes and/or blind-drilled bores or their countersinks (15) such that the additional blind-drilled bores (50) have a connection to each of the holes and/or blind-drilled bores or their countersinks (15) closest to it.

006090" 6/27/86

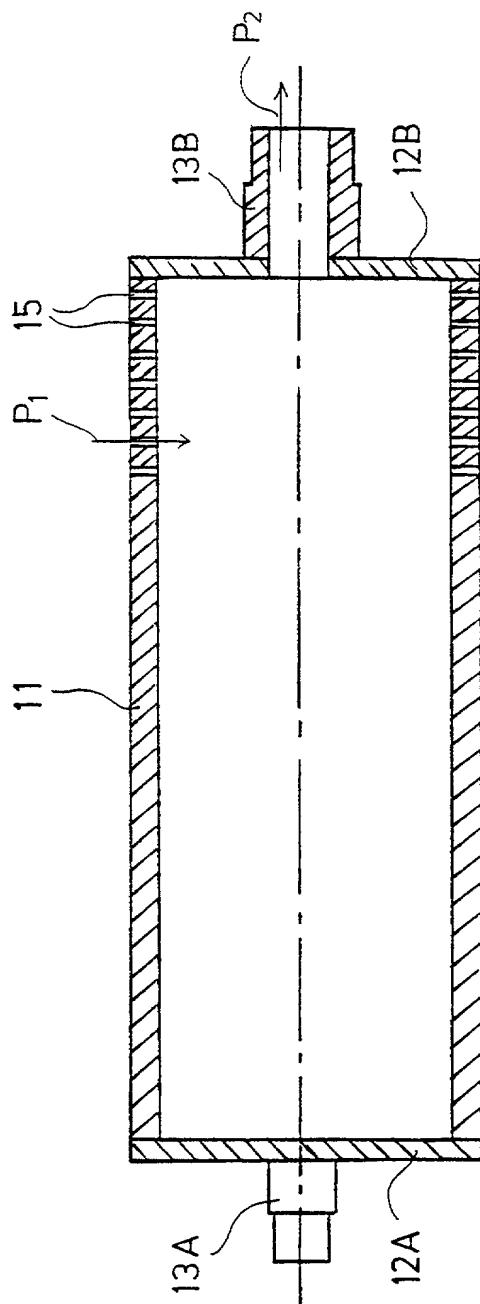


FIG.1

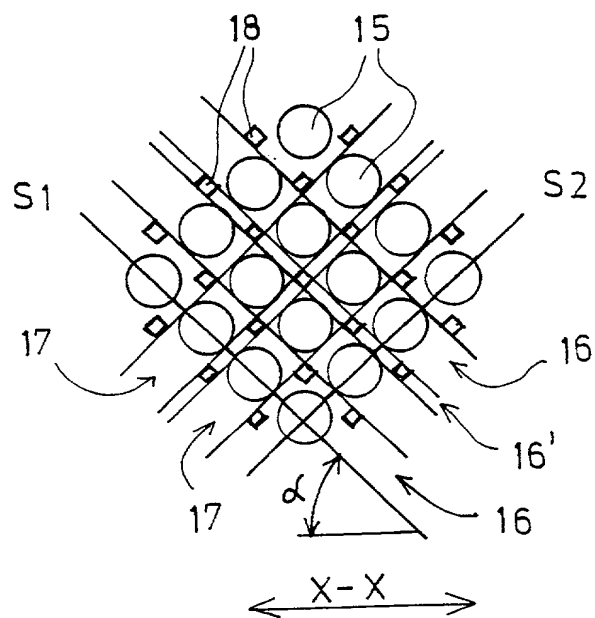


FIG. 2A

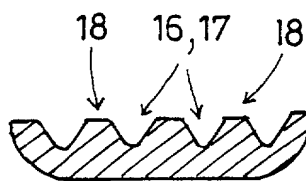
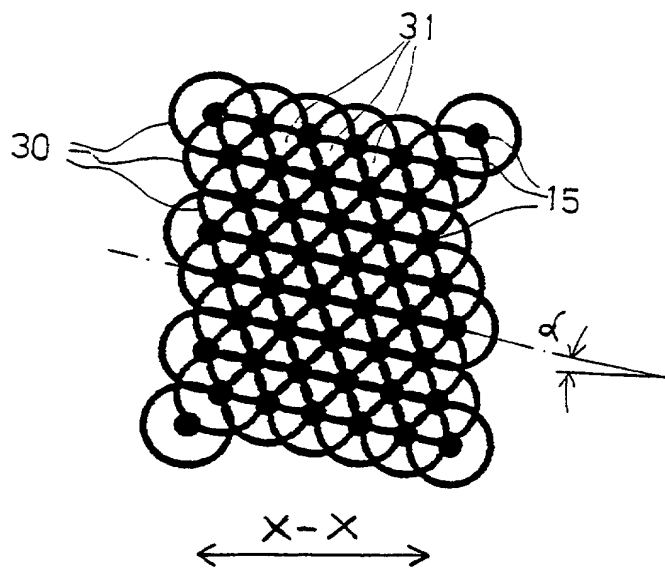
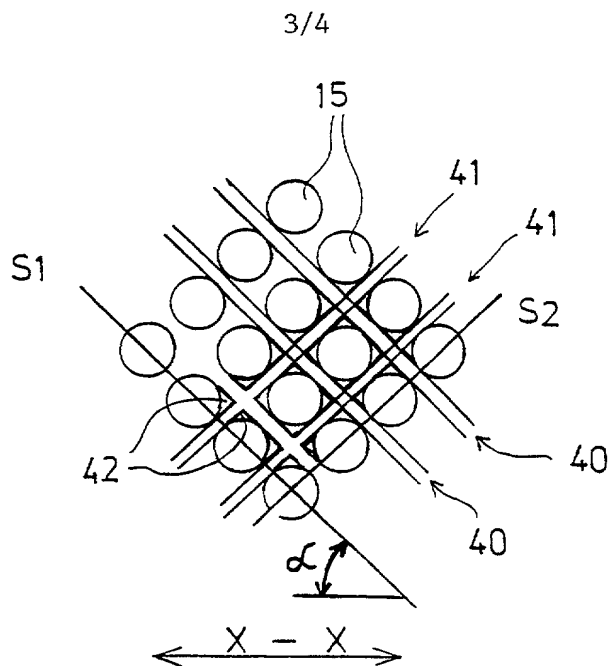


FIG. 2B

005090" 6.2.1995



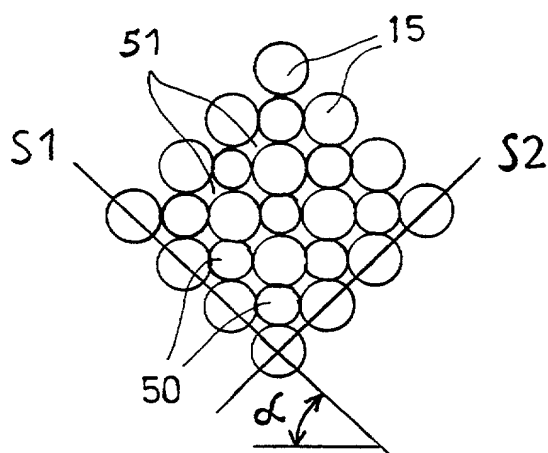


FIG. 5

U.S.A. DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ROLL FOR A PAPER OR BOARD MACHINE

the specification of which (check one)

 X is attached hereto.

 was filed on as Application Serial No. and was amended on . I hereby authorize and request my attorneys, Steinberg & Raskin, P.C. of 1140 Avenue of the Americas, New York, New York 10036 to insert the filing date and application number when known.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is known to us to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim priority benefits under Title 35, United States Code, §119 of any foreign and/or provisional application(s) for patent or inventor's certificate listed below and have also identified below any foreign and/or provisional application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR APPLICATIONS

974480

Finland

December 10, 1997

Priority claimed

X

Yes

No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/FI98/00943

December 3, 1998

pending

And I hereby appoint

5 —
Martin G. Raskin, Registration No. 25,642,
Harold D. Steinberg, Registration No. 17,255,
Joshua L. Raskin, Registration No. 40,135,
Anthony L. Meola, Registration No. P44,936,
Jason E. Hardiman, Registration No. 36,157

my attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith; correspondence address:

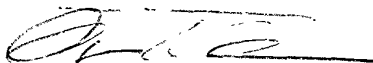
STEINBERG & RASKIN, P.C.
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Osmo NIKULAINEN

Inventor's signature



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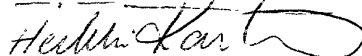
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Inventor's signature

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Date

Residence

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